

# Dynamics of a charge qubit encoded in a double quantum dot

J. Łuczak<sup>1</sup> and B.R. Bułka<sup>1</sup>

<sup>1</sup>*Institute of Molecular Physics, Polish Academy of Sciences,  
ul. M. Smoluchowskiego 17, 60-179 Poznań, Poland*

We present the studies of the coherent dynamics of two coherently coupled quantum dots connected to external electrodes. For a single electron case the system can be used to encode a charge qubit [1], for which the dynamics and the read-out can be detected by current measurements. In the regime of sequential tunneling we use the full counting statistics [2] and the waiting time distribution [3] to investigate in details statistics of the tunneling events and their mutual correlations. In a short time regime the qubit dynamics, its coherent rotation on the Bloch sphere, can be directly seen in jump events when an electron is injected to and leave the system. We also consider a renewable effect which is important for qubit operations. The thermodynamics properties of the system, taking into account heat transfers and their correlations with charge currents, are studied as well.

## References:

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